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- i. *Account of a remarkable Fiery Eruption from the Earth, in Iceland, in the Year 1783. By S. M. HOLM, S.S. Theol. Cand.*

THE following account is taken from a small work written by Mr. Holm, a clergyman, and published in the Danish language at Copenhagen, with two charts. The author says, in his preface, that he was born in the island in the year 1750, and lived there till the year 1774; that he had himself seen all the places mentioned in it, and had since kept up an uninterrupted epistolary correspondence with his countrymen, from whom he received the particulars of the devastation occasioned by this singular disaster.

On the 1st of June 1783, several violent shocks of an earthquake were felt in various parts of Iceland; and these shocks afterwards increased to such a degree, that, on the 11th of the same month, the inhabitants were obliged to desert their habitations and to live in the open air. About the same time smoke and vapour were seen to rise alternately from the earth in the wild districts towards the north, in the neighbourhood of Sidu, Landbrot, Medalland and

Alptaver. After this three columns of fire were observed, the most northern of which first made its appearance. When first seen, they flamed up separately; but they afterwards united and rose to such a height that they could be perceived at the distance of thirty-four miles, when the flame was not covered by thick vapour.

Iceland is bordered by a long chain of mountains, which are all exceedingly high and always covered with snow. The largest and highest of these is the Klofa-Jökul, in which the principal and best known rivers of the island formerly had their sources. Among these mountains there are also four volcanoes, the Skaptar-Jökul, the Sula, Trœlladyngia, and the Oerœfa-Jökul, the last of which is the most violent. They at first throw out water, and then fire. There are several of the same kind in the island; but the well known Hecla throws out only fire.

On the 8th of June the bright flames of the before-mentioned column could be clearly distinguished. They were accompanied with a violent and incessant eruption of sand, sulphureous dust, ashes, large pumice stones, and most dreadful explosions. A furious wind, which prevailed at the same time, filled the atmosphere in such a manner with sand and sulphureous vapour, that people could not see either to read or to write even at noon. The ashes and scoræ which fell back from the atmosphere were red hot. There fell at the same time a kind of filth as black as ink, which seemed as it were hairy, having sometimes the appearance of small balls, and sometimes of wreaths or rings.

On the 11th the fiery column, which had vanished for a little, again made its appearance, and could be distinctly seen at the distance of thirty or forty miles. Its thundering noise could be heard at the same distance, and continued throughout the whole summer. The above column was accompanied the same day by a very violent rain, which occasioned infinite damage; because the water, in many places, swept off whole pieces of the soil and carried them with it
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into the deep gulphs. The water of this rain was at the same time so sharp and acrid, on account of the many saline and sulphureous particles which it contained, that it occasioned severe pain in the hands and feet where it fell.

The places in the neighbourhood of this column were at the same time exposed to violent cold, snow, and hail of an uncommon magnitude; but, as the column extended farther, these were succeeded by a scorching and almost unfufferable heat, and the sun appeared like a red globe. This heat continued for several days without interruption, and returned several times in succession. All those places to which this destructive column extended were, by the showers of stones and ashes that accompanied it, deprived of all their grass and every other plant; so that the inhabitants were reduced to great distress, and their cattle were frequently killed on the spot. In many places every vegetable production was as it were covered by a hard crust, from the continual sulphureous evaporation.

When this fiery eruption first broke out, the river Skapta was swelled up in an uncommon manner, and a like overflowing was observed in several other rivers. On the 11th of June the Skapta suddenly disappeared, and became totally dry in the course of twenty-four hours. Its bed was situated in a gulley called Skaptar-Gliufur, which extends four miles northwards through the highest rocks, and is above 200 fathoms deep. In this monstrous gulley there arose, the second day after the Skapta was dried up, a dreadful and undefcribable fiery lake, which gradually increased till it overflowed the banks and filled all the neighbouring places whether high or low, the most exalted summits only excepted. Having inundated the farm of Buland, it covered not only the adjacent fields and hedges, but also the houses and the church, though the farm is situated on a high rock. Towards the east it extended six miles in breadth; its extent towards the west was also considerable; but towards

the south its progress had been checked by lofty mountains.

Thus swelled and towering up into huge waves it endeavoured on all sides to procure a passage, which, by its continually pressing forwards, it at length effected towards the south in a valley between the mountains. Through this opening it rushed with incredible violence and force, like the most terrible cataract, into the plain on the south, over which it rolled, amidst strong concussions of the earth and awful thunder and explosions in the atmosphere, carrying before it stones, rocks and small eminences. This flaming lake boiled and foamed in a dreadful manner with melted stones, iron, and other substances capable of being liquefied; some of the ignited rocks and stones, as large as whales and houses, were seen swimming on its surface, or driving up and down.

In the mean time smoke and vapour arose from the earth, both in the neighbourhood of this fiery lake and in the more remote districts. All these appearances continued incessantly both day and night from the 12th of June till the 12th of August. The lake still spread itself in the open plains, but with less impetuosity than before. The boiling and foaming, however, continued until it at length began to settle, and to form itself into a solid body. In many places it was found to have been 70, and in others 140 fathoms in depth. When it threw itself with violence into the bed of any river, the water which it displaced overflowed all the adjacent lands, and still added to the devastation and distress it occasioned. Seventeen farms were burnt by the fiery stream, and four swept entirely away by the water, besides a great many others which were destroyed by lightning and the large stones that fell from the atmosphere; so that their inhabitants were reduced to poverty, and obliged to wander about begging for relief. Three large rivers, the before-mentioned Skapta, the Hlverfisflot, and the Steinmyrarflot,

myrarfliot, besides eight smaller ones, were found entirely dried up.

On the 16th of August the fiery lake began to cease spreading farther. Wherever it proceeded it had burnt and destroyed houses, churches, villages, fields, meadows and forests. Among the places destroyed were many abounding with excellent herbs, such as the *elymus arenarius*, and medicinal plants; the want of which was a great and irreparable loss to the island.

This fiery eruption, however, did not yet cease, but continued to rage with fury till October in the middle parts of the island, where vapour, flames, thunder and concussions of the earth were in succession observed among the cold and extensive mountains. In the first half of November little change had taken place; but the flames began gradually to burn up with more brightness, which was considered as a sign that the inflammable matter was now nearly exhausted, and that the flame would be extinguished; especially as it had before assumed a variety of colours, such as green, blue and the like, according to the difference of the substances by which it had been nourished.

When the eruption first took place, the whole atmosphere of the island was so filled with smoke, vapour and dust, that the sun had entirely a red appearance. In the neighbourhood of the mountains it was perfectly dark at noon; and the cold in the night time, considering the warmth of the season, was very sensible. Where the atmosphere was dry, the fire made the air highly oppressive; but where moist, such severe winter cold was produced in it, that the grass, plants, and cattle were almost destroyed. The cows gave scarcely an eighth part of the usual quantity of milk; and a four-year-old wether, which before would have had ten pounds of fat, had now only two, and was so weak as to be scarcely able to stand.

The ashes, sulphur and rain which fell from the heavens, were so pestilential that they seemed to penetrate the very

bodies of the cattle. Their hoofs became white; their hair fell off; and they were covered all over with pustules and ulcers. The meadows also suffered severely; and the cattle which had endeavoured to pick up the few scanty remains of grafs that had been left, might be seen lying dead on them in heaps. Many others were destroyed by hunger; and it was only a few that were saved by the means of hay. The cattle in general were so stunned, sometimes by the dreadful explosions of the thunder, and the incessant roaring and fire in the atmosphere, that they ran into marshy places, threw themselves over precipices, or even rushed into the flames.

These uncommon phenomena were no less destructive to the inhabitants. Many, in particular old people, and those whose lungs were weak, could with difficulty breathe on account of the sulphureous stench and vapour proceeding from the flames. Many also who enjoyed good health were reduced to a state of illness; and many would have been suffocated had not moderate showers of rain, which fell sometimes, cooled and refreshed the atmosphere.

Besides these circumstances which took place in Iceland, many other phenomena worthy of notice occurred in the neighbourhood. A new island was thrown up in a part of the sea where, according to the account of experienced seamen, the water before had been about a hundred fathoms in depth. Its distance from Iceland was sixteen, and from Bird Island eight miles. In the month of August it threw up bright flames; and it continued to burn till February 1784. Later accounts state that towards the end of the year it threw up a large column of fire intermixed with sand. This island was about half a mile in circumference, and its height appeared to be equal to that of the mountain Efsan.

Towards the north-west, nearer to Iceland than the old eastern gulph of Greenland, lies another very high island, larger than the former; which, according to the latest ac-

counts, has for a long time burnt day and night. We have been informed also by accounts from Iceland and Norway, that a violent fiery eruption took place in the most distant wilds of Greenland, opposite to the northern part of Iceland; and also in other places, previous to that of the latter above described. This is confirmed by letters dated September the 14th, in which it is said that a violent north wind from the sea had brought over to the northern coast of Iceland abundance of ashes, with a strong sulphureous smell; and this phenomenon continued the whole summer.

The effects of these remarkable phenomena seem to have extended also to other countries. At the time when the before mentioned acrid rain prevailed in Iceland, an uncommonly sharp and penetrating rain of the like kind fell at Drontheim and other parts of Norway. In the Feroe islands this rain burnt as it were the leaves of the trees, and the grafs on the fields had a blackish appearance. When the wind blew from the N.W. great quantities of ashes, sand and sulphureous vapour fell in these islands, though they are eighty miles distant from Iceland; and the sails and decks of several ships, while on their passage between Copenhagen and Iceland, were covered with black sandy dust. Even in Zealand and at Copenhagen the sun, from the beginning of June till the 8th of August, seemed remarkably red; and throughout the whole month of July the atmosphere was so filled with dust and vapour, that the sun could not be seen in the evening after eight or nine o'clock. Even at noon the sun was red, and this was observed in the night-time to be the case with the moon and the stars. The learned Professor Kratzenstein said that these phenomena must proceed from a fiery eruption in Iceland; which was the more remarkable as Iceland lies at the distance of almost 300 miles from Copenhagen, towards the north-west. Others said they arose from the great heats which frequently happened, and particularly on the 27th and 29th of July, and the 5th of August. The earth

at this time was almost incapable of producing either herbs or grafts, and the leaves even withered on the trees. A whitish grey kind of dust was seen to fall towards the ground; and the fields in the night were often overspread with a blueish mist, which was accompanied with a certain pale fiery brightness and a sulphureous smell. During the nights when this fog prevailed, little or no dew fell. Phenomena of the same kind were observed in Germany, Holland, and other countries.

II. *An Account of TOALDO's System respecting the Probability of a Change of Weather at the different Changes of the Moon. From Journal des Sciences Utiles.*

WERE the sun the only cause of the variations of the weather, the regular course of that luminary, from year to year, would produce the same weather in the same seasons. The principal variations of the weather, however, depend upon some other cause not so uniform, the discovery of which has long given employment to philosophers; and as we find that the motion of the sea seems to have an intimate connection with the motion of the moon, it has thence been believed, that the latter acts a principal part, not only in this phenomenon of the flux and reflux, but that it could not produce these variations on the earth, without having, at the same time, a considerable influence on the atmosphere. The difference of the fluids which compose it, and, above all, the great elasticity of the air, can alter this effect, but not entirely destroy it.

It is well known that no philosopher has yet been able, from mere theory, to form any proper conclusion respecting these variations of the weather. To supply this deficiency, M. Toaldo called in the aid of experience, and compared the state of the atmosphere with the situation of the moon, where its activity appeared to be strongest and weakest.

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